

New and Reconsidered Mexican Acanthaceae XII

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Six new species of Mexican Acanthaceae are described, illustrated, and mapped: *Carlownrightia yucatanensis*, *Justicia zapoteca*, *Louleridium dendropilosum*, *L. rzedowskianum*, *Poikilacanthus foliosepalus*, and *P. pochutlensis*. Information on phenology, habitats, and preliminary conservation assessments are provided for each of these species. Two new combinations are proposed in *Justicia*, *J. chrysostephana* and *J. durangensis*, based on *Cyrtanthera chrysostephana* Hook.f. and *Siphonoglossa durangensis* Henr. & Hilsenb., respectively. *Justicia lindenii* Houlet and *Justicia ardens* T.F. Daniel are treated as new synonyms of *J. chrysostephana*.

KEYWORDS: *Carlownrightia*, *Justicia*, *Louleridium*, *Poikilacanthus*, pollen

Se describen, ilustran y mapean seis especies nuevas de Acanthaceae mexicanas: *Carlownrightia yucatanensis*, *Justicia zapoteca*, *Louleridium dendropilosum*, *L. rzedowskianum*, *Poikilacanthus foliosepalus* y *P. pochutlensis*. Se proporciona información sobre fenología, hábitats y evaluaciones preliminares de conservación para cada una de estas especies. Se proponen dos combinaciones nuevas en *Justicia*, *J. chrysostephana* y *J. durangensis*, basadas en *Cyrtanthera chrysostephana* Hook.f. y *Siphonoglossa durangensis* Henr. & Hilsenb., respectivamente. *Justicia lindenii* Houlet y *Justicia ardens* T.F. Daniel son tratados como sinónimos nuevos de *J. chrysostephana*.

With about 400 species in 36 genera of Acanthaceae, Mexico appears to have the fourth-richest assemblage of that family among the world's nations (exceeded only by India, Madagascar, and Brazil). Herewith, additional undescribed species as well as taxonomic and nomenclatural renovations are noted for the family in Mexico. Four of the six new species are from the southern Mexican state of Oaxaca, the richest state in the country for species of vascular plants, as well as for Acanthaceae (Daniel 2013). Preliminary conservation assessments based on IUCN (2017) guidelines are provided for the species described here.

NEW SPECIES

Carlownrightia yucatanensis T.F. Daniel, sp. nov.

Carlownrightia yucatanensis differs from its congeners by the combination of being perennial herbs or shrubs to 1.5 m tall; having corollas entirely white, pseudopapilionaceous, and 8–12 mm long; having capsules pubescent with eglandular trichomes only; and having seeds with the margin ± swollen and pectinate.

TYPE.—MEXICO. **Yucatán:** Mpio. Panabá, ca. 10 km N of Panabá toward San Felipe, 21°23.3'N, 088°14.9'W, 3 m elev., subdeciduous forest, 26-II-2003 (flr, frt), *T. Daniel*, *G. Carnevali* & *J. Tapia 10320* (holotype: MEXU!; isotypes: CAS!, CICY!, COLO!, F!, K!, MICH!, MO!, NY!, RSA!, US!).

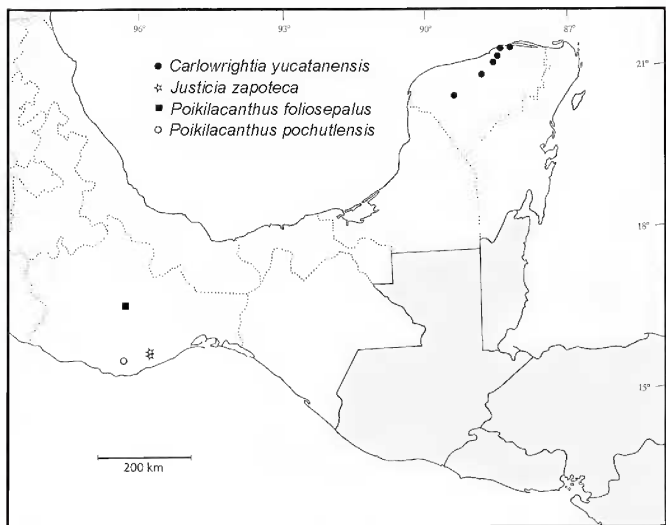
Perennial herbs or shrubs to 1.5 m tall. Young stems subterete to subquadrate, pubescent with flexuose to antrorse to retrorse eglandular trichomes to 0.8 mm long and distally sometimes with erect subglandular and/or glandular trichomes to 0.3 mm long as well, trichomes \pm concentrated in 2 lines. Leaves (sometimes absent or nearly so during anthesis) petiolate, petioles to 20 mm long, blades ovate to elliptic to narrowly elliptic, (10–) 22–69 mm long, (4.5–) 6.5–32 mm wide, 1.6–4.8 times longer than wide, subacuminate to acuminate at apex, acute to rounded to subcordate at base, surfaces pubescent with mostly antrorse eglandular trichomes, margin flat, ciliate with antrorse trichomes. Inflorescence of axillary and terminal dichasiate spikes, these often branched and forming panicles of spikes, rachis evenly pubescent with erect to flexuose glandular and eglandular trichomes 0.05–0.3 mm long, branches of panicles (when present) subtended by subulate to linear, sterile inflorescence bracts up to 9 mm long; dichasia (opposite, subopposite or) alternate, sessile, 1–many-flowered. Bracts subtending dichasia opposite to subopposite, subulate to lanceolate, 1–2 mm long, 0.4–0.5 mm wide, abaxial surface pubescent like rachis. Bracteoles triangular-subulate to lance-subulate, 0.9–1.5 mm long, 0.4–0.6 mm wide, abaxial surface pubescent like rachis. Flowers sessile to subsessile (i.e. borne on pedicels to 0.5 mm long). Calyx 2.2–4.5 mm long, abaxially pubescent like rachis, lobes subulate to triangular-subulate, 1.1–2.9 mm long. Corolla entirely white, 8–12 mm long, externally glabrous except lower-central lobe (and extending to tube) externally pubescent with erect to flexuose eglandular trichomes 0.2 mm long, tube 2–2.8 mm long, upper lip 8–9.5 mm long, 1.5–3 mm wide, apically 2-fid with lobes to 0.1 mm long, lower lip 6–10 mm long, lobes 5.3–8 mm long, 2.2–4 mm wide, lower-central lobe conduplicate and partially enclosing stamens. Stamens 5.5–8.5 mm long, filaments glabrous, thecae 1.3–1.8 mm long; pollen euprolate to perprolate, 3-colporate, 6-pseudocolpate, polar diameter 48–50 μ m, equatorial diameter 24–26 μ m, colpi flanked on each side by a pseudocolpus, colpi 6.7 μ m wide at equator, colpal surface microechinate, intercolpal surface biretulate. Style 8–10 mm long, glabrous, stigma lobes 0.1–0.15 mm long. Capsule 9.5–14 mm long, pubescent with erect to flexuose eglandular trichomes 0.05–0.2 mm long, stipe 4–7 mm long, head 6–7 mm long. Seeds up to 4, 4–4.1 mm long, 4–4.2 mm wide, surfaces papillate, margin \pm swollen and pectinate with subconic tubercles (these sometimes united with one another and appearing as an irregularly pectinate wing).

PHENOLOGY.— Flowering: February–March, July; fruiting: February–March.

DISTRIBUTION AND HABITAT.— Southern Mexico (Yucatán; Fig. 1); plants occur on limestone in thornscrub, tropical deciduous forest, and tropical subdeciduous forest at elevations from near sea level to 17 m. Plants were observed in forest understory, forest edges, cut-over forest, successional fields, and disturbed areas.

ILLUSTRATIONS.— Figures 2, 3.

FIGURE 1. Map of southern Mexico (and northern Central America, shaded) with distributions of *Carlowrightia yucatanensis* (Yucatán), *Justicia zapoteca* (Oaxaca), *Poikilacanthus foliosepalus* (Oaxaca), and *P. pochutlensis* (Oaxaca).



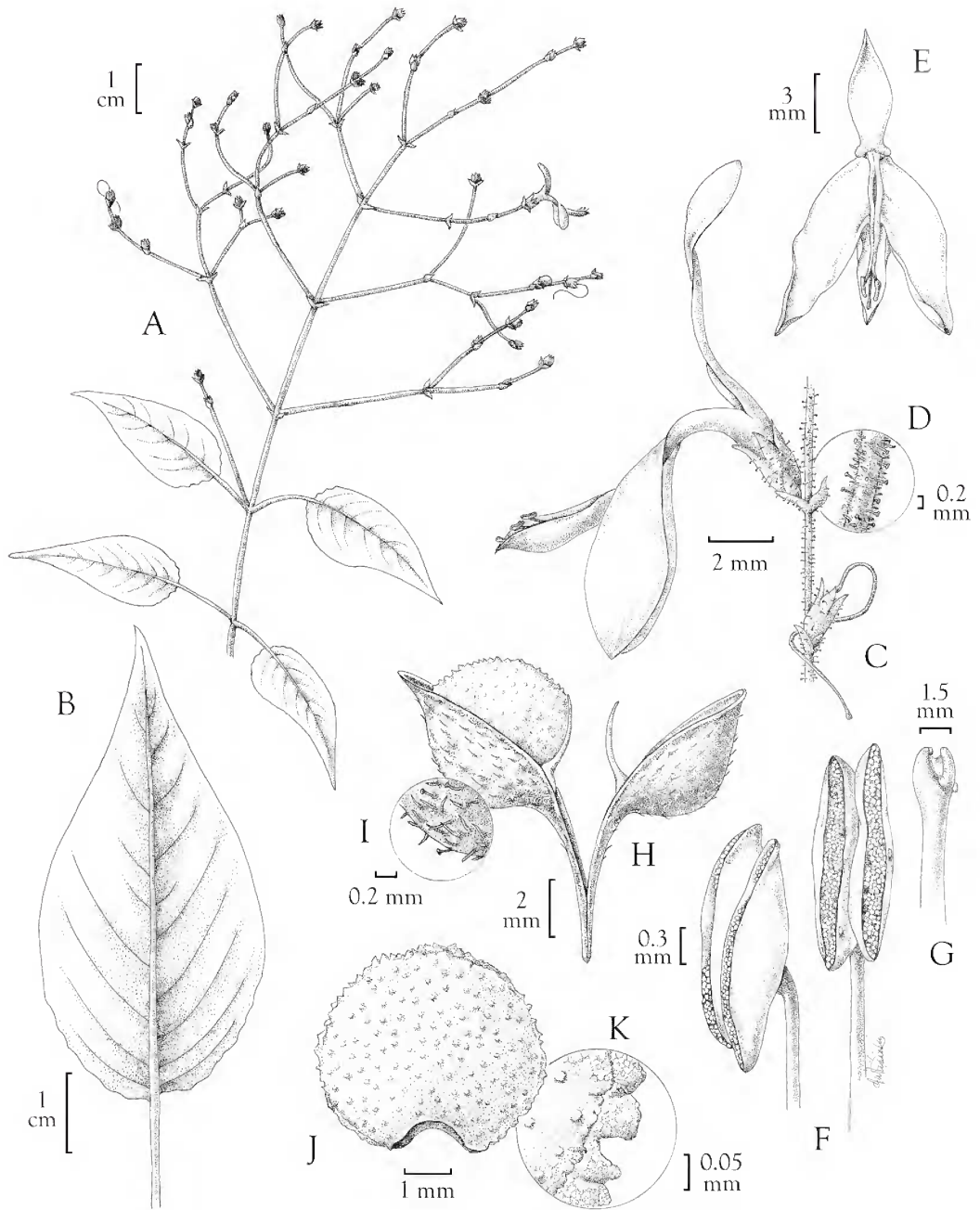


FIGURE 2. *Carlowrightia yucatanensis*. A. Shoot with inflorescence. B. Leaf. C. Inflorescence nodes with corolla dehisced (bottom) and corolla present (top) in side-view. D. Magnification of inflorescence rachis. E. Corolla in front-view. F. Distal portion of stamen with bithecos anther, side-view (left) and front-view (right). G. Distal portion of style and stigma. H. Capsule with one seed. I. Magnification showing pubescence on surface of capsule. J. Seed. K. Magnification of seed margin. (A, B from Daniel et al. 10312; C–K from Daniel et al. 10320). Drawn by Amy Whitesides

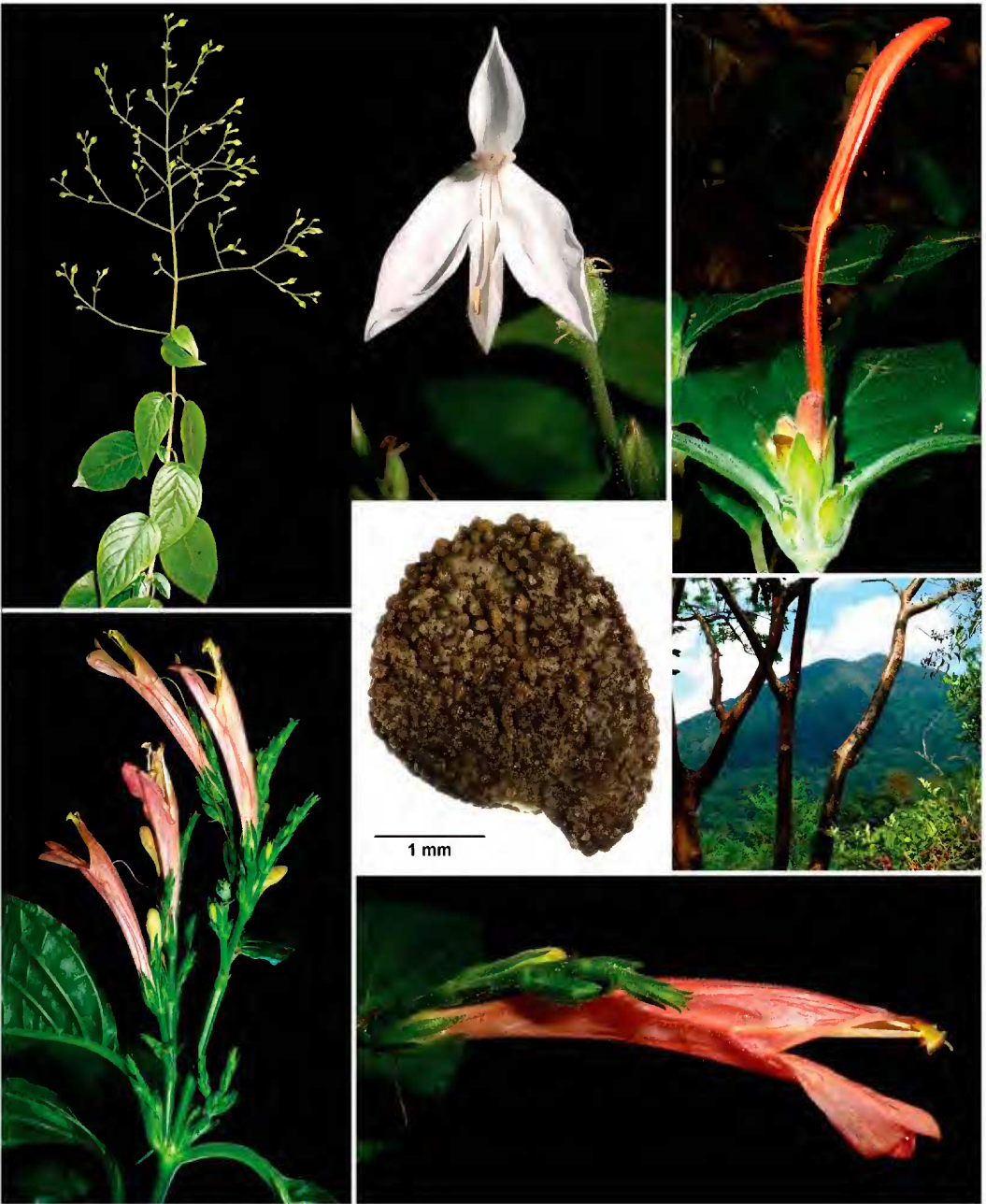


FIGURE 3. Photographs of Acanthaceae. *Carlowrightia yucatanensis* (Carnevali et al. 4381), habit (top left) and flower (top middle); *Poikilacanthus pochutlensis* (Daniel & de Avila 12204), apex of shoot with mature flower bud (top right) and Cerro Espino, locale of only known collections (middle right); *Justicia zapoteca* (Daniel et al. 11898cv), apex of shoot with inflorescence and flowers (bottom left), seed (middle center), and flower (bottom right). Photos by the author, except *C. yucatanensis* photos by G. Carnevali F. (used with permission).

CONSERVATION.— The species has been recorded from at least six sites in the dry, northern portion of the Yucatan Peninsula, where it has an EOO of 1904 km². At two sites plants were observed to be locally frequent to common (e.g., ca. 50 individuals within 50 m²). Like many of its congeners, *C. yucatanensis* often occurs in disturbed habitats (e.g., along roadsides). There appears to be considerable habitat for this species in this portion of the peninsula, and it occurs in at least one protected landscape (Reserva Río Lagartos). Although human population pressures and climatic changes will impact (either negatively or positively?) the distribution and numbers of individuals of this species, there are currently no immediate threats that have been identified. Thus, given its apparently restricted distribution, a preliminary assessment of Near Threatened (NT) is proposed for this species using IUCN criteria (IUCN 2017).

PARATYPES.— MEXICO. **Yucatán:** alrededores de la zona arqueológica de Mayapan, 1 km S de Telchaquillo, carr. Tecoh–Oxkutzcab, [ca. 20.628200, -89.460844] *E. Cabrera & H. de Cabrera 9120* (MO); 4–6 km W de Las Coloradas, camino al cruceo San Felipe–Río Lagartos, [ca. 21.609482, -88.048721], *E. Cabrera & H. de Cabrera 15739* (CICY, CIQR, MEXU, MO); Mpio. Izamal, 10–12 km W Tunkas de Izamal, carr. a Tunkas, ca. 20°54'N, 88°50.5'W, *G. Carnevali et al. 4381* (CICY); Mpio. Río Lagartos, entre el camino Río Lagartos rumbo a Las Coloradas, 21°34'N, 88°10'W, *C. Chan 4796* (CICY); Mpio. Río Lagartos, camino de Río Lagartos rumbo a Las Coloradas, 21°36.5'N, 88°03'W, *C. Chan 4809* (CICY); Mpio. Sucila, along hwy. 176 between Buctotz and Sucila (27 km W of Sucila), 21°10.5'N, 088°28.8'W, *T. Daniel, G. Carnevali, & J. Tapia 10312* (CAS, BR, CICY, DUKE, F, K, MEXU, MO, NY, US).

DISCUSSION.— Based on several morphological similarities (e.g., pubescent capsules, swollen and irregularly pectinate margin of the seed), Carnevali et al. (2005) treated plants of *Carlownrightia yucatanensis* from the Yucatán Peninsula as a third distinctive population of *C. hintonii* T.F. Daniel. Since then, reexamination of materials from these populations reveals that the morphological distinctions of plants from the Yucatán Peninsula are more reflective of a distinct species than a variant of *C. hintonii*. The following key summarizes distinctions between them.

- 1a. Corollas white with a papillate (yellow?) eye on upper lip, 15–18.5 mm long, tube 7–8.5 mm long, lobes of lower lip widely spreading (i.e., at angles $\geq 45^\circ$) from lower-central lobe; bracteoles (at fertile nodes of inflorescences) 1.5–2.5 mm long; filaments pubescent with trichomes to 0.1 mm long; pubescence of capsule all or chiefly glandular (in some plants from El Salvador, capsules all or chiefly eglandular); Pacific versant with plants occurring at elevations at or above 380 m *C. hintonii*
- 1b. Corollas entirely white (lacking a papillate eye of any color on upper lip), 8–12 mm long, tube 2–2.8 mm long, lobes of lower lip spreading from lower-central lobe at angles $< 45^\circ$; bracteoles (at fertile nodes of inflorescences) 0.9–1.5 mm long; filaments glabrous; pubescence of capsule entirely eglandular; Caribbean versant with plants occurring at elevations from sea level to 20 m *C. yucatanensis*

Plants observed in late February (*Daniel et al. 10312, 10320*) showed massive flowering over several days with plants covered in flowers. These were visited by two kinds of small to medium-sized butterflies, honey bees, and smaller bees or flies. Corollas began dehiscing and falling in light winds at 13:45, which conforms to observations made on other species of the genus elsewhere in the United States and Mexico (Daniel 1983).

Based on morphological characters, *Carlownrightia yucatanensis* would pertain to section *Papilionaceae* of Daniel (1983). However, molecular phylogenetic data (Daniel et al. 2008; McDade et al. in press) reveal that neither the genus nor this section is monophyletic. Indeed, the results of McDade et al. (in press; as *C. hintonii*) reveal that the placement of *C. yucatanensis* rel-

ative to its congeners is ambiguous, depending on analytical method. Pollen of *C. yucatanensis* (Fig. 4A, B) conforms to that otherwise known for the genus (Daniel 1983, 1998). Macromorphological differences between *C. yucatanensis* and *C. myriantha* (Standl.) Standl., the only other species of the genus to occur in the Yucatán Peninsula, were summarized by Daniel (1993) and Carnevali F. et al. (2005).

Justicia zapoteca T.F. Daniel, sp. nov.

Justicia zapoteca can be distinguished by the following combination of characters: leaf blades with at least the adaxial surface pubescent; inflorescences of axillary and/or terminal, pedunculate, and dichasiate spikes or panicles of dichasiate spikes; calyces unequally five-lobed, with four lobes equal to subequal in size and the posterior lobe filiform and greatly reduced in size; corollas pale red-pink (salmon) to purplish, 25–32 mm long, and externally pubescent with glandular and eglandular trichomes; anther thecae superposed, perpendicular, dorsally pubescent, and the lower theca with a basal appendage 0.3–0.5 mm long; pollen two-aperturate with apertures flanked on each side by two rows of insulae (and sometimes peninsulae as well); capsules 12–16 mm long and pubescent with glandular and eglandular trichomes; and seeds with the testa tuberculate and with the tubercles granulate.

TYPE.— MEXICO. **Oaxaca:** Distr. Pochutla, Mpio. San Miguel del Puerto, ca. 13 km NW of Xadani, ca. 4 km upslope from Rancho Monte Carlo, 16°00.771'N, 096°06.305'W, 1400 m, tropical subdeciduous forest (selva mediana subperennifolia) to mesophytic montane forest, 24-II-2012 (flr, frt), *T. Daniel, E. Lott, J. Pascual, & N. Salas M. 11898* (holotype: MEXU!; isotypes: CAS!, MO!, NY!, SERO!, TEX!).

Trailing perennial herbs to erect shrubs to 3 m; young stems subquadrate and substrate to striate, internodes glabrous or sparsely 2-fariously pubescent with flexuose to antrorsely and/or retrorsely appressed eglandular trichomes to 0.7 mm long, nodes and axillary buds pubescent with eglandular trichomes. Leaves petiolate, petioles to 55 mm long, blades ovate to elliptic, 42–170 mm long, 22–101 mm wide, 1.6–2.8 × longer than wide, (rounded to) acute to acuminate at apex, truncate to rounded to acute to subattenuate at base, adaxial surface pubescent with antrorse to antrorsely appressed eglandular trichomes restricted to major veins or to midvein only, abaxial surface glabrous or very sparsely pubescent like adaxial surface, margin entire. Inflorescence of axillary and/or terminal pedunculate dichasiate spikes or panicles of dichasiate spikes to 120 mm long (including peduncle and excluding flowers), peduncles to 13 mm long, glabrous or evenly puberulent with erect eglandular and subglandular trichomes to 0.05 mm long (puberulent) and sometimes also with an overstory of erect to flexuose eglandular trichomes to 0.7 mm long, bracts subtending panicle branches ovate to linear-elliptic to subulate, 3–8 mm long, 0.3–3 mm wide; fertile portion of individual spikes to 87 mm long and 2–3 mm wide (excluding corollas), rachis clearly visible, evenly puberulent and usually also with an overstory of erect glandular trichomes 0.1 mm long (especially distally) and sometimes also with erect to flexuose eglandular trichomes (sometimes sparse) 0.1–0.5 mm long, or sometimes glabrous proximally; dichasia alternate (1 per node), ± secund, sessile, 1-flowered. Bracts not imbricate, opposite, subulate to lance-subulate, 2–3 mm long, 0.3–0.6 mm wide, abaxial surface pubescent like rachis. Bracteoles linear-subulate to lance-subulate, 1.8–2.6 mm long, 0.3–0.5 mm wide, abaxial surface pubescent like bracts. Flowers sessile to subsessile (i.e., pedicels to 0.5 mm long). Calyx 5-lobed, 3.5–6 mm long, abaxially pubescent like bracteoles, lobes heteromorphic (4+1, posterior lobe reduced), 4 lobes equal to subequal in size, lanceolate, 3–5 mm long, 0.6–1 mm wide, widest near base or midpoint, posterior lobe inconspicuous, filiform, 0.4–2 mm long, 0.05–0.2 mm wide. Corolla pale red-pink (salmon) to purplish, 25–32 mm long, externally pubescent with erect to flexuose eglandular and glandular (some-

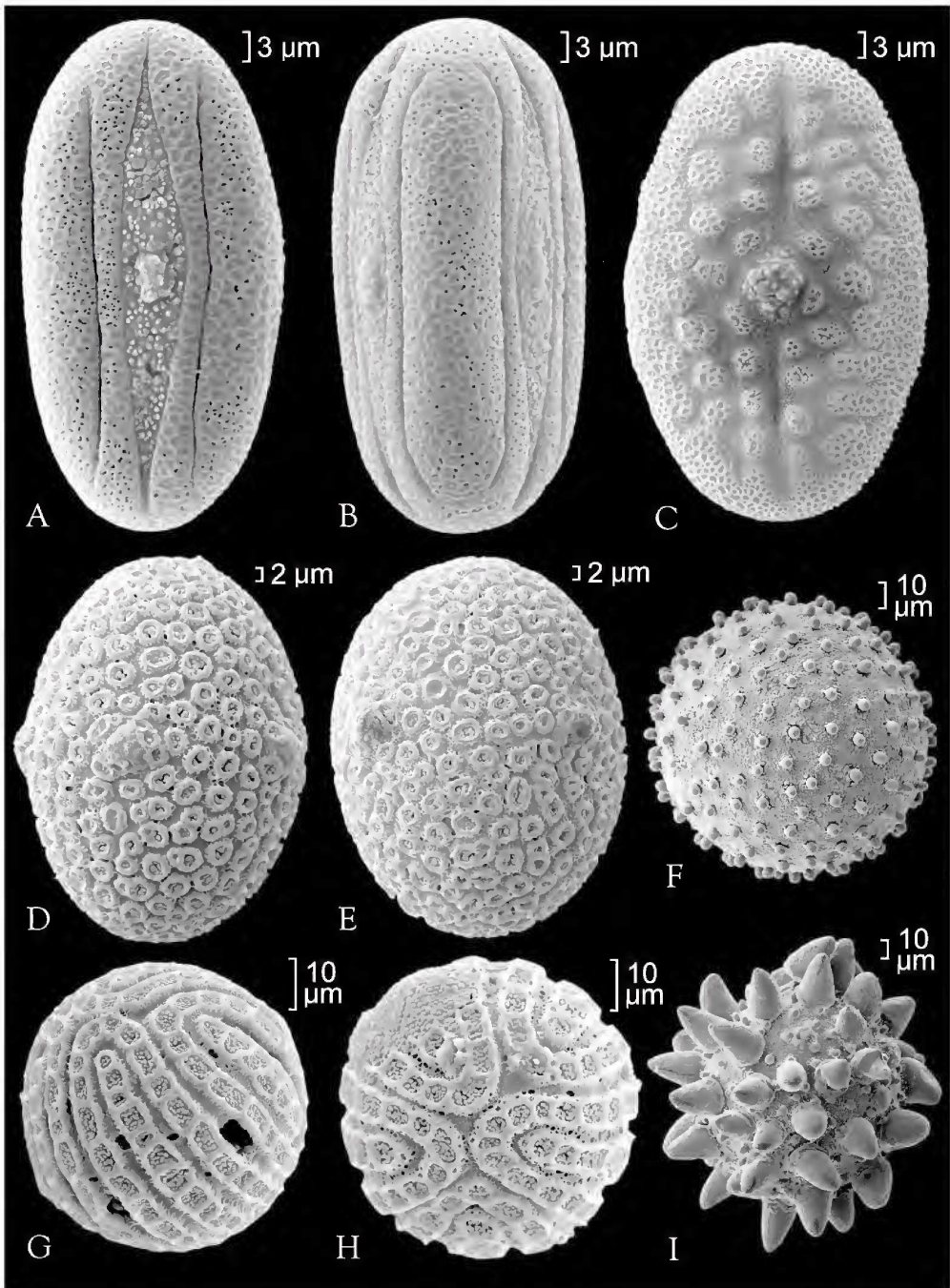


FIGURE 4. Pollen of Acanthaceae. A, B. *Carlowrightia yucatanensis* (Daniel et al. 10320), apertural view (A) and interapertural view (B). C. *Justicia zapoteca* (Saynes V. & Elorsa 2741), apertural view. D, E. *Poikilacanthus foliosepalus* (Hernández O. 326), apertural view (D) and interapertural view (E). F. *Louteridium dendropilosum* (Fernández N. 4189). G, H. *Poikilacanthus pochutlensis* (Torres & Martínez 4907), subpolar view (G) and polar view (H). I. *Louteridium dendropilosum* (Daniel et al. 11784), with internal contents extruding via pores.

times sparse) trichomes 0.05–0.2 mm long, tube 18–23 mm long, gradually expanded distally, 2.5–3.5 mm in diameter near midpoint, upper lip 6–12 mm long, 2-fid at apex, lower lip 7–12 mm long, lobes 1–2.5 mm long, 1–2.2 mm wide. Stamens 8–12.5 mm long, thecae superposed (touching or separated by a gap to 0.2 mm), perpendicular, 1.1–1.8 mm long (including basal appendage), subequal to unequal in length, both dorsally pubescent (trichomes sometimes few or inconspicuous) with erect to flexuose eglandular trichomes to 0.1 mm long, lower theca with a spurlike to pointed basal appendage 0.3–0.5 mm long; pollen 2-aperturate, polar diameter 55–56 μm , equatorial diameter (apertural view) 35 μm , apertures flanked on each side by 2 rows of insulae (and sometimes with peninsulae as well). Style 26–33 mm long, proximally pubescent with eglandular trichomes, stigma to 0.1 mm long, lobes not evident (appearing subcapitate) or unequally 2-lobed, 1 lobe 0.1 mm long, other lobe 0.05 mm long. Capsule 12–16 mm long, pubescent with erect to retrorse eglandular and glandular trichomes to 0.2 mm long, head 7.5–10 mm long, with slight medial constriction. Seeds compressed, \pm cordate, 2–4 mm long, 2–2.8 mm wide, surface bubbly tuberculate, surface of tubercles granulate.

PHENOLOGY.— Flowering: November–April; fruiting: November–April. On a plant cultivated out-of-doors during a period of dry and mostly sunny weather in San Francisco, California, 10 flower buds were tagged, and the times of their opening and dehiscence/falling from the plant were recorded in six hour intervals. All flowers opened between 06:00 and 08:00. They stayed open between 72 and 258 hours, with the average life span of a flower being 152 hours (6.3 days) with the population standard variation of 49.29 hours. Corollas and styles showed no obvious signs of senescence (e.g., discoloration or withering) when the former dehisced and fell from the plant.

DISTRIBUTION AND HABITATS.— Southern Mexico (central southern Oaxaca; Fig. 1); plants occur infrequently in the understory of evergreen seasonal forests (*selva mediana subperennifolia*) transitioning to mesophytic montane forests, and sometimes in coffee plantations (*cafetales*) therein, at elevations from 690 to 1640 meters.

ILLUSTRATIONS.— Figures 3, 5.

CONSERVATION.— This species is known from at least six collections in the same region of the Sierra Madre del Sur in southern Oaxaca. A considerable portion of its EOO, which consists of 4.6 sq. km, lies in a region where coffee is cultivated. Given the increasing demand for coffee, such cultivation is likely to expand in the region, thereby presenting an inferred threatening event. Although the actual geographic range of this species is likely considerably larger than currently known, based on the data available, a preliminary assessment of Critically Endangered (CR) appears warranted, and is proposed for this species (B1, a, b; IUCN 2017).

PARATYPES.— MEXICO. **Oaxaca:** Distr. Pochutla, Mpio. San Miguel del Puerto, ca. 13 km NW of Xadani, ca. 4 km upslope from Rancho Monte Carlo, 16°00.771'N, 096°06.305'W, *T. Daniel, A. Sánchez, & J. Pascual 11810* (CAS, K, MEXU, MO, NY, RSA, SERO, US), specimens of plants from this locality cultivated from seed of type collection in San Francisco, California, *T. Daniel et al. 11898cv* (CAS); Distr. Pochutla, Mpio. San Miguel del Puerto, cafetal “Arroyo Arena,” 15°58'36.8"N, 096°05'59.7"W, *A. Nava. Z. et al. 268* (MEXU, SERO); Distr. Pochutla, Mpio. San Miguel del Puerto, Piedra de Agua, 15°57'11.2"N, 096°06'23.6"W, *J. Pascual 224* (CAS, MEXU, SERO); Distr. Pochutla, Mpio. San Miguel del Puerto, camino a El Vija, 16°00'42.6"N, 096°06'43.6"W, *J. Pascual 2326* (MEXU, SERO); Distr. Pochutla, Mpio. San Miguel del Puerto, 150 m N de la finca Monte Carlo, 15°59'38.1"N, 096°06'22.3"W, *A. Saynes V. & M. Elorza 2741* (CAS, MEXU).

DISCUSSION.— Rarely, the proximal-most axillary branch of a panicle bears only a single dichasium, and thus appears like an axillary pedunculate dichasium. Although not evident on living plants, at the nodes of dried plants the region of attachment of the petioles on stems is greater

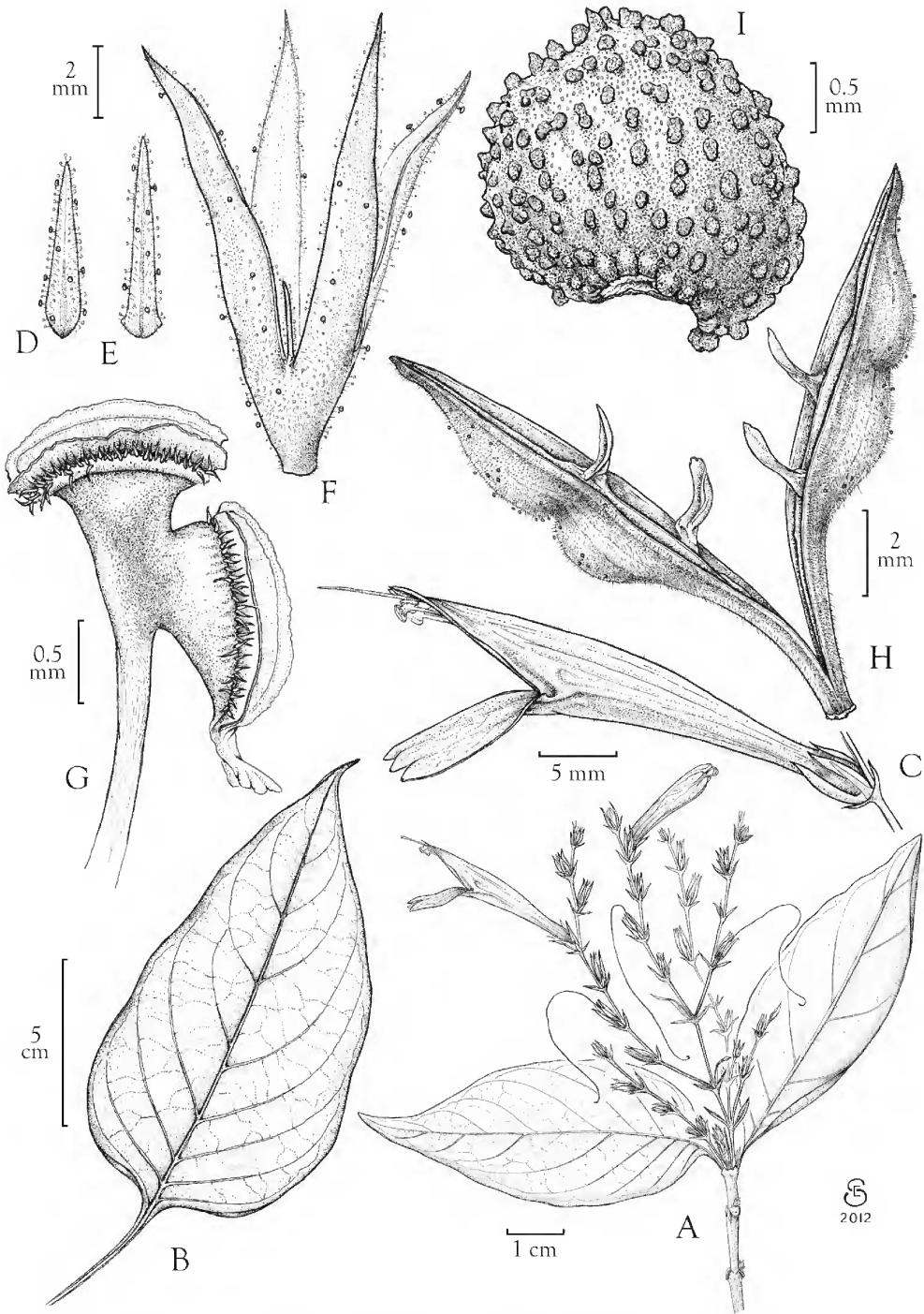


FIGURE 5. *Justicia zapoteca*. A. Shoot with inflorescence. B. Leaf. C. Inflorescence node with flower. D. Bracteole. E. Bract. F. Calyx. G. Distal portion of stamen with bithecous anther. H. Capsule. I. Seed. (A, C from Daniel *et al.* 11898; B, H, I from Daniel *et al.* 11810; D–G from Saynes *V. & Elorsa* 2741). Drawn by Sean Edgerton.

in diameter than the petiole and appears as a circular flange around the base of the petiole, and remains as a protruding flangelike or shieldlike leaf scar after the leaf has dehisced. This would appear to be due to considerable shrinkage of the petiole on drying.

Justicia zapoteca would appear to pertain to Graham's (1988) section *Sarotheca* (Nees) Benth. based on characters of the inflorescence, calyx, and seed. Indeed, it superficially looks much like the southern Central American species, *J. oerstedii* Leonard, which differs by having glabrous leaf blades, bright red corollas bearing only eglandular trichomes, unappendaged and glabrous anther thecae that are equally to subequally inserted and parallel to subsagittate but separated by a connective 0.2–0.6 mm long. Pollen of *J. zapoteca* (Fig. 4C) conforms to that occurring in several of the sections of the genus recognized by Graham (1988), and to the most commonly encountered type among Mexican species of the genus (Daniel 1998).

***Louteridium dendropilosum* T.F. Daniel, sp. nov.**

Louteridium dendropilosum differs from its congeners by the following combination of characters: epipetric habit, four stamens, and dendritic trichomes on some vegetative and reproductive organs.

TYPE.—MEXICO. Oaxaca: Distr. Pochutla, Mpio. San Miguel del Puerto, Arroyo Arena, ca. 100 m downstream from jct. Río Laja, ca. 3 km SE of Rancho Dioon toward Xadani, 15°58'51.33"N, 096°05'53.91"W, 600 m, evergreen seasonal forest (selva mediana subperennifolia), 29-III-2011 (flr, frt), T. Daniel, A. Sánchez, & J. Pascual 11784 (holotype: MEXU!; isotypes: CAS!, COLO!, K!, MO!, NY!, SERO!, US!).

Shrubs to trees to 12 m tall, frequently epipetric, larger individuals with prop trunks/roots. Older (woody) stems quadrate, lenticellate, irregularly striate-sulcate, lacking trichomes; younger (herbaceous) stems subquadrate-sulcate [terete on fresh stems], sparsely lenticellate, irregularly fissured, [lacking trichomes on fresh stems] evenly pubescent with erect to flexuose simple and dendritic (sparse) eglandular trichomes <0.1–0.5 mm long. Leaves deciduous, often ± clustered at apex of old growth or at apex of an otherwise leafless shoot of new growth, petiolate, petioles often tinged with pink or red, to 60 mm long, blades subsucculent, ovate to elliptic to broadly elliptic, 76–180 mm long, 40–107 mm wide, 1.4–2.5 × longer than wide, apiculate to acuminate at apex, rounded to acute to attenuate at base, adaxial surface pubescent with simple and dendritic eglandular trichomes, trichomes soon becoming ± restricted to proximal portion or to midvein, abaxial surface pubescent (especially along veins) with dendritic trichomes to 0.5 mm long, midvein often pinkish or reddish, margin entire (sometimes undulate and appearing subcrenate). Inflorescence a terminal sessile to pedunculate dichasiate raceme to 220 mm long, peduncle to 50 mm long, pubescent like young stems, rachis pubescent like young stems; dichasia opposite or alternate, sessile, 1-flowered, to 47 mm long. Bracts caducous, not seen. Bracteoles caducous, not seen. Flowers pedicellate, pedicels 21–46 mm long, pubescent like rachis or with the trichomes to 1 mm long. Calyx 17–32 mm long, lobes subhomomorphic to subheteromorphic, membranaceous, subelliptic to ovate-elliptic to subrhombic-obovate, rounded to acute at apex, abaxially pubescent with mostly dendritic trichomes 0.1–0.5 mm long, posterior lobe planar, 17–32 mm long, 10–19 mm wide, usually slightly larger and sometimes more conspicuously venose than lateral lobes, major veins often maroon, lateral lobes planar, 20–31 mm long, 8–18 mm wide. Corolla light green or greenish yellow, sometimes with maroon on limb (especially at base of lobes) and distal portion of throat, externally glabrous (inconspicuously glandular punctate but lacking elongate trichomes), 50–62 mm long, tube 35–37 mm long, narrow proximal portion of tube 11–15 mm long, 6–10.5 mm diameter near midpoint, throat 20–24 mm long, 25–35 mm diameter at mouth, lobes recurved to recoiled, broadly ovate-subtriangular, 13–20 mm long, 10–21 mm wide, entire at apex. Stamens

4, 60–80 mm long, filaments glabrous distally, pubescent with eglandular trichomes near base (i.e., fused portion of pairs), pairs fused at base up to 9 mm, thecae 8–10.5 mm long; staminode consisting of a rodlike projection 0.6 mm long in dorsalmost position; pollen subspheroidal to spherical (P:E = 0.96–1.04), pantoporate, 114–131 μm in diameter, exine surface microrugulate to microverrucate and with overstory of gemmae and/or baculae. Style 70–101 mm long, distally glabrous, pubescent with eglandular and glandular trichomes near base, stigma equally 2-lobed, lobes flattened, broadly elliptic, 1–2 mm long, 1–1.4 mm wide. Capsule 25–28 mm long, densely pubescent with erect glandular trichomes 0.05–0.5 mm long and with an overstory (sometimes sparse) of erect to flexuose (sometimes dendritic) eglandular trichomes to 1.4 mm long, stipe 2.5–3.5 mm long. Seeds to 16 per capsule, 5.2–7 mm long, 5–6.4 mm wide, surfaces smooth and lacking trichomes, margin \pm thickened, densely pubescent with hygroscopic trichomes expanding to 0.5 mm long when moistened (appearing as a \pm solid to irregularly eroded peripheral band when dry).

PHENOLOGY.— Flowering: February–March; fruiting: March–April. As in some other species of *Louteridium*, flowering takes place during the dry season when leaves are often absent (e.g., February). Near the end of the dry season (e.g., late March) when flowering is waning and fruits are mature, a new flush of vegetative growth appears from axils of clustered leaf scars at the base of the inflorescence (which eventually falls away). As the cluster of new leaves develops (fig. 7), internodal stem growth takes place between at least one of the pairs and the remaining cluster (e.g., the young stems of the description above).

DISTRIBUTION AND HABITAT.— Southern Mexico (central southern and southeastern Oaxaca; Fig. 6); plants occur on karstic slopes of streams in evergreen seasonal forest (*selva mediana subperennifolia*) and tropical deciduous forest (*bosque tropical caducifolio*) with *Beaucarnea*, *Brosimum*, *Bursera*, *Lonchocarpus*) at elevations from 600 to 750 m.

ILLUSTRATIONS.— Figures 7, 8.

CONSERVATION.— This species is known only from the Sierra Madre del Sur and the Isthmus of Tehuantepec in Oaxaca, consisting of two locations ca. 137 km apart. The EOO is 32.1 sq. km. None of known occurrences is on protected lands. At the type locality in 2014, about 50 mature plants were observed in an area of ca. 2250 square meters on rocky limestone slopes above a stream. Much or all of this locality has since been destroyed by road-building activities at that site (S. Salas, pers. comm. in March 2015). With on-going development of these and other types (e.g., agricultural) of human disturbances at one of the two locations, a decline in populations or population sizes has been observed and would seem likely to continue. Thus, a preliminary assessment of Endangered (En) is proposed for this species (B1, a, b; IUCN 2017).

PARATYPES.— MEXICO. **Oaxaca:** Distr. Pochutla, Mpio. San Miguel del Puerto, Arroyo Arena, ca. 100 m downstream from jct. Río Laja, ca. 3 km SE of Rancho Dioon toward Xadani, *T. Daniel*, *E. Lott*, *J. Pascual*, and *N. Salas* M. 11894 (CAS, MEXU); Mpio. El Barrio, 9 km N [sic] de El Barrio, Cerro Palmasola, antenna microondas [ca. 16°44'32.52"N, 095°05'36.04"W], *R. Fernández* N. 4189 (IEB, NY); Distr. Pochutla, Mpio. San Miguel del Puerto, Arroyo Arena,

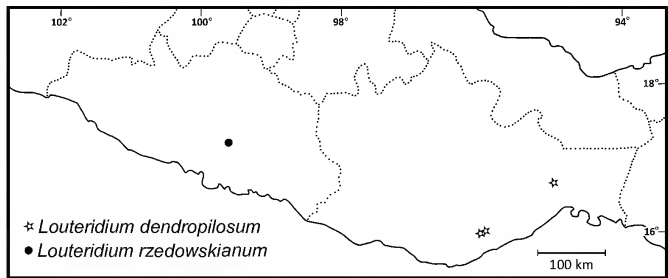


FIGURE 6. Map of southern Mexico with distributions of *Louteridium dendropilosum* (Oaxaca) and *L. rzedowskianum* (Guerrero).



FIGURE 7. *Louteridium dendropilosum*. From left to right and top to bottom: habit of two 4-year old plants germinated from seeds; trunks and prop roots of epipetric plant; flower with dorsal calyx lobe, yellowish green corolla, androecium (with two stamens partially broken off), and style+stigma; inflorescence with two flowers having just opened at night; nearly mature flower bud with dorsal calyx and one lateral calyx; recently opened flower showing four fertile stamens and style/stigma; greenish purple corolla with stamens in side view and front-view. Three photos on left from *Daniel et al. 11784*; all others from *Daniel et al. 11894*.

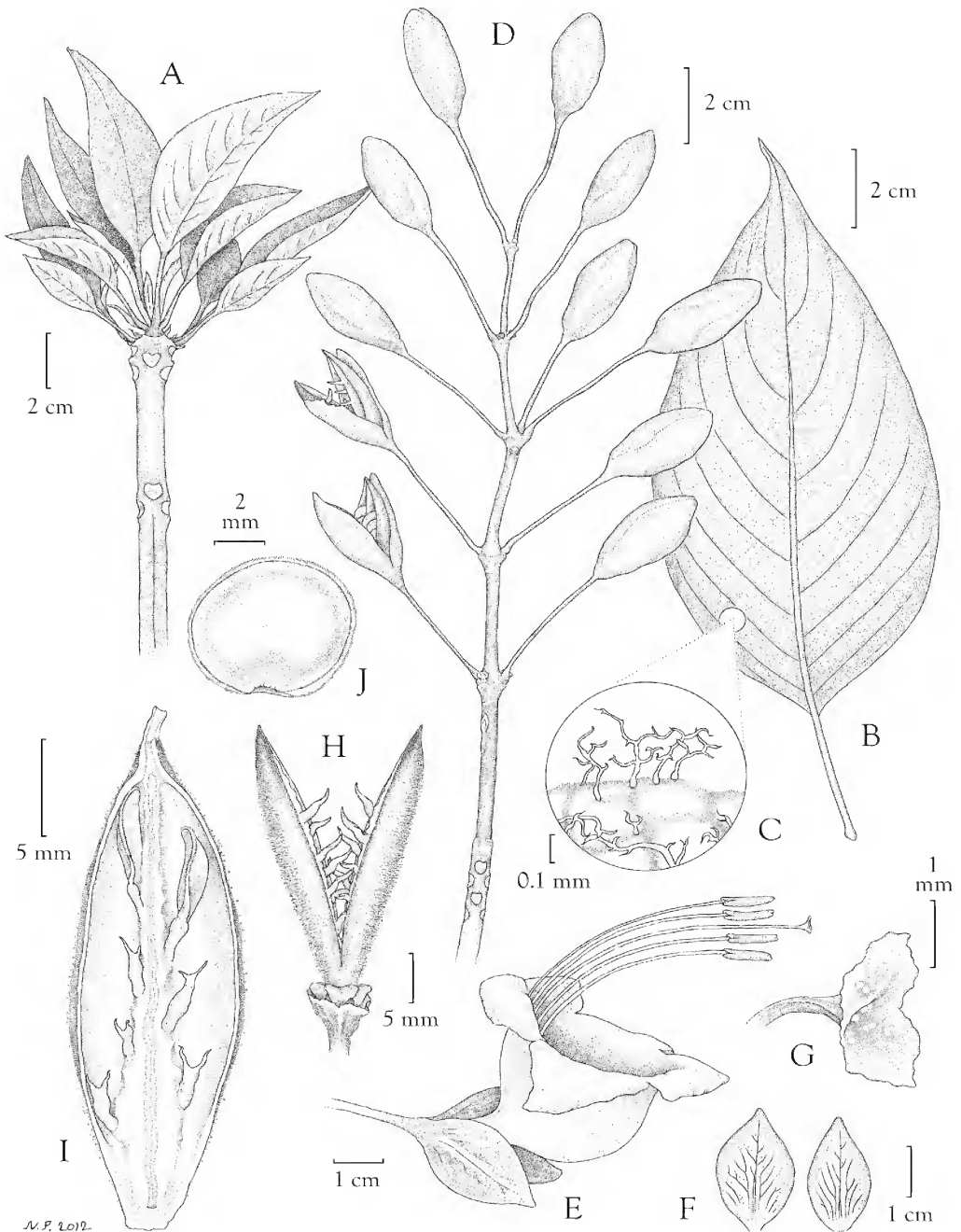


FIGURE 8. *Louteridium dendropilosum* (Daniel et al. 11784). A. Habit with new growth. B. Mature leaf. C. Trichomes from abaxial leaf surface. D. Inflorescence in fruit from woody shoot. E. Flower. F. Calyx lobes (dorsal on left, one of laterals on right). G. Stigma. H. Dehiscent capsule. I. Capsule (internal view). J. Seed. Drawn by Noel Pugh.

15°58'39.7"N, 096°05'54.9"W, *J. Pascual 1396* (MEXU, SERO, TEX); Distr. Pochutla, Mpio. San Miguel del Puerto, 300 m de la terracería sobre la vereda rumbo Río la Laja, 15°58'49.9"N, 096°06'6.9"W, *A. Saynes V. et al. 3831* (MEXU, SERO); Distr. Juchitán, Mpio. El Barrio, parte alta del Cerro Palmasola, junto a la antena de microondas [ca. 16°44'32.52"N, 095°5'36.04"W], *S. Zamudio R. 6352* (CAS, IEB).

DISCUSSION.— Pollen of *Louteridium dendropilosum* (Fig. 4F, I) resembles that of its congeners. The posterior calyx lobe of this species is conspicuously venose with the major veins purple, whereas the lateral lobes are green (Fig. 7). A major morphological distinction among species of *Louteridium* S. Wats. is the number of stamens (two vs. four). This distinction does not appear to correlate with either geography or molecular phylogenetic relationships (based on the limited sampling to date; Tripp et al. 2013). *Louteridium dendropilosum* is unique among congeners by its dendritic trichomes, which are present on both vegetative and reproductive organs. Trichomes of other species may consist of one or more cells and be either glandular or eglandular, but they are not branched.

***Louteridium rzedowskianum* T.F. Daniel, sp. nov.**

Louteridium rzedowskianum differs from its congeners by the following combination of characters: stamens four, calyx 5–9 mm long with lobes broadly ovate to triangular and 3.5–6.5 mm long, and capsule pubescent with glandular trichomes only.

Louteridium brevicalyx Rzed., *Ciencia* (México) 28: 53. 1973, non *Louteridium brevicalyx* A. Richardson (1972), nom. inval. *Louteridium rzedowskii* T.F. Daniel, *Madroño* 31: 91. 1984, nom. inval.

TYPE.— MEXICO. **Guerrero:** Mpio. Chilpancingo, Rincón de la Vía, cerca de Agua de Obispo [ca. 17°17'45.05"N, 099°28'17.54"W], 750 m, 19-I-1964 (flr), *H. Kruse 1380* (holotype: ENCB-002790-shoots bearing flowers only; photo seen; isotypes (shoots bearing flowers only): EAP!, ENCB-002789!, FCME!, MEXU!, MICH!, MO!, US!), see discussion below.

Shrubs to trees to 4 m tall, trunk to 15 cm in diameter at base. Older (woody) stems irregularly fissured-striate, lenticellate, glabrous; younger stems not seen. Leaves deciduous, clustered at branch apices, petiolate, petioles 20–90 mm long, blades apparently subsucculent, lanceolate to ovate to elliptic, 82–260 mm long, 35–110 mm wide, 2–2.6 × longer than wide, (rounded to) acuminate at apex, cuneate to subattenuate at base, abaxial surface minutely glandular punctate (sometimes not evident) and sparsely pubescent (especially near base) with flexuose eglandular trichomes 0.2–0.7 mm long or trichomes absent on mature leaves, adaxial surface very sparsely pubescent (if at all) with similar trichomes, margin entire to subsinuate, sparsely ciliate with trichomes like those of abaxial surface. Inflorescence a terminal, pedunculate thyrses to 30.3 cm long (including peduncle and excluding corollas), peduncle glandular puberulent with glandular trichomes to 0.1 mm long, rachis pubescent with erect glandular trichomes 0.05–0.2 mm long; dichasia opposite, pedunculate, mostly 1–3-flowered, to 50 (–70 in fruit) mm long (excluding corollas), dichasial peduncles 6–14 (–29 in fruit) mm long, pubescent like rachis. Bracts caducous (not seen). Bracteoles caduceous (not seen). Flowers pedicellate, pedicels 23–30 (–48 in fruit) mm long, pubescent like rachis. Calyx 5–9 mm long, lobes subheteromorphic, apparently subsucculent, abaxially pubescent with erect to flexuose glandular trichomes 0.05–0.2 mm long, posterior lobe subconduplicate, broadly ovate to subtriangular, 3.5–4.5 mm long, 3–4.3 mm wide, sometimes smaller than lateral lobes, subacute to acute at apex, lateral lobes planar, ovate to subtriangular, 4–4.8 mm long, 3–4 mm wide, acute at apex. Corolla dark purple with green in places or green with purple in places (fide Rzedowski 73), 35–39 mm long, externally puberulent with erect glandular trichomes to 0.1 mm long, tube 17–30 mm long, narrow proximal portion of tube 4.5–9 mm long, 6–11 mm in

diameter near midpoint, throat 11-20 mm long, 20-25 mm in diameter at mouth, upper lip 11-15 mm long, lobes ovate to subtriangular, 10-11 mm long, 9-11 mm wide, lower lip 12-15 mm long, lobes ovate to subtriangular, 12-13 mm long, 11-12 mm wide. Stamens 4, exerted 35 mm beyond lips of corolla, 55-75 mm long, filaments not seen, thecae 7.5-8 mm long. Style 80-82 mm long, glabrous, stigma \pm funnellform, 1.5 mm long. Capsule 38-47 mm long, pubescent throughout with erect glandular trichomes to 0.1 mm long, stipe 4 mm long. Seeds up to 24 per capsule, 4-4.5 mm long, 3-4 mm wide, surfaces minutely granulate to \pm scurfy, marginal region swollen, periphery pubescent with appressed hygroscopic trichomes.

PHENOLOGY.— Flowering: January; fruiting: January–March. Label information on the type notes that flowers are “pronto caedizas,” possibly referring to their being soon deciduous during the day, and thus likely largely nocturnal as in other species of the genus.

DISTRIBUTION AND HABITAT.— Western Mexico (central Guerrero; Fig. 6); plants occur on limestone slopes in tropical subdeciduous forests (*selva mediana subcaducifolia*) at elevations near 750 m.

ILLUSTRATION.— Rzedowski (1973: fig. 4).

CONSERVATION.— This species remains known only from the type locality, where an unknown number of individuals occurs, and from which specimens were collected over a period of seven years (1963–1970). No information is known as to the current status of this population or any possible threats to it. Therefore, according to IUCN (2017) guidelines, *Louteridium rzedowskianum* has to be assessed as Data Deficient (DD).

PARATYPES.— MEXICO. **Guerrero:** Mpio. Chilpancingo, Rincón de la Vía, cerca de Agua de Obispo [ca. 17°17'45.05"N, 099°28'17.54"W], 9-VIII-1964 (vegetative) and 23-III-1963 (fruiting), *H. Kruse 1380* (EAP, ENCB, FCME, MEXU, MICH, MO, US); Mpio. Chilpancingo, Rincón de la Vía [17°17'15"N, 99°28'55"W], 27-I-1970, *H. Kruse 2701* [catalog # 4755] (MEXU); same locale, 14-VII-1970, *H. Kruse 2701-b* [catalog #5033] (FCME, MEXU).

DISCUSSION.— Although validly published at the time, but illegitimate, *Louteridium brevicalyx* Rzed. is no longer accepted as valid because more than one gathering was included within the type—a retroactive change in Article 8 of the nomenclatural rules enacted in the “Saint Louis Code” (Greuter et al. 2000). This species subsequently became known as “*L. rzedowskii*” when Daniel (1984) proposed a new name for Rzedowski’s later homonym. Daniel’s name also became invalid with the change in Article 8. To rectify this situation, and to honor Jerzy Rzedowski and his recognition of the species, *Louteridium rzedowskianum* is herewith newly described.

The sole collector of this species, Hubert Kruse, obtained specimens of these plants on multiple occasions in order to have leaves, flowers, and fruits. These were admixed to create “complete” herbarium specimens, with an indication of the date of collection of foliage (i.e., 9 Aug 1964), flowers (i.e., 19 January 1964), and fruits (i.e., 23 March 1963) on each one. Because the specimens all contain materials of these organs collected on different dates, the citation of any one of the specimens as the type is no longer acceptable for valid publication of the name. The flowering portion (only) of the Kruse specimen designated by Rzedowski as the holotype of *L. brevicalyx* at ENCB is designated above as the holotype of *L. rzedowskianum*. Fruiting and vegetative portions of this specimen, those same portions on the isotypes noted above, and the subsequent (1970) Kruse collections noted above are all paratypes.

Agua de Obispo is about 3 km (linear distance) NE of Rincón de la Vía, on the old Chilpancingo–Acapulco highway (Mexico 95). It is at an elevation of about 960 meters, whereas Rincón de la Vía is at about 750 meters. Therefore Kruse’s locality information is somewhat contradictory. I have mapped the species between these two locales. Kruse made additional collections from the type locality in 1970. Plants bearing leaves only were collected from the type locality in July and

August. Leaves are not present on plants collected in January–March. According to information on *Kruse 2701-b*, leaves were taken from the same individual from which fruits and flowers were collected at other times.

This species can be distinguished from *L. brevicalyx* A. Richardson, which also occurs in dry forests of western Mexico, by characters in the following couplet:

Calyx 10–14 mm long, 3-lobed or 5-lobed with 3 large lobes and 2 reduced lobes, 3 large lobes lanceolate to ovate, 8–11 mm long; capsule pubescent with straight, eglandular trichomes 0.2–0.5 mm long; Michoacán *L. brevicalyx*
Calyx 5–9 mm long, 3-lobed (reduced lobes absent), lobes broadly ovate to triangular, 3.5–6.5 mm long; capsule pubescent with glandular trichomes to 0.1 mm long (lacking straight, eglandular trichomes); Guerrero *L. rzedowskianum*

***Poikilacanthus foliosepalus* T.F. Daniel, sp. nov.**

Poikilacanthus foliosepalus differs from its congeners by the following combination of characters: short and few-flowered dichasiate spikes in leaf axils, elliptic calyx lobes 10–11 mm long and 2.7–5 mm wide, red corollas 39–49 mm long that are externally pubescent with eglandular trichomes only, and four-aperturate pollen covered with densely spaced but mostly discrete insulae.

TYPE.—MEXICO. **Oaxaca:** Distr. Tlacolula, Mpio. Mitla, Tierra de Santo Pie de Cerro, 16°55'24.3"N, 96°24'21"W, 1673 m, selva baja caducifolia, 29-VII-2009 (flr), *H. Hernández O. 326* (holotype: MEXU!; isotypes: CAS!, SERO!).

Perennial herb to shrub to 8 dm tall; young stems subquadrate and 4-sulcate, evenly pubescent with erect to flexuose eglandular trichomes 0.2–0.9 mm long. Leaves ascending to appressed, petiolate, petioles to 5 mm long, blades ovate to elliptic (to obovate), 17–38 mm long, 11.5–22 mm wide, 1.2–1.7 × longer than wide, emarginated to rounded to acute at apex, cuneate at base, surfaces and margin pubescent with cauline type trichomes (although sometimes antrorse) and with trichomes denser on abaxial surface, major veins yellowish and prominent, margin entire. Inflorescence of short dichasiate spikes in axils of leaves; spikes pedunculate, few-flowered, peduncles 2–4 mm long, pubescent like young stems, rachis evenly pubescent with erect to flexuose eglandular trichomes 0.05–0.1 mm long; dichasia alternate (1 per node), 1-flowered, sessile. Bracts sessile, subfoliose, broadly elliptic to subcircular, 7–10.5 mm long, 4–8 mm wide, rounded at apex, abaxial surface pubescent like leaves. Bracteoles narrowly elliptic to oblanceolate, 3–4.5 mm long, 0.6–0.8 mm wide, abaxial surface pubescent like bracts. Flowers subsessile (i.e., borne on pedicels to 1.5 mm long), mostly 2 per spike. Calyx 5-lobed, 12–13 mm long, lobes elliptic, 10–11 mm long, 2.7–5 mm wide, acuminate-subcaudate at apex, abaxial surface ± prominently 3–5-veined, pubescent with flexuose to appressed eglandular trichomes 0.05–0.3 mm long or nearly glabrous distally, margin conspicuously ciliate with flexuose eglandular trichomes to 1 mm long. Corolla red, 39–49 mm long, externally pubescent with flexuose eglandular trichomes 0.1–0.4 mm long, tube only very gradually and ± inconspicuously expanded distally (throat ± indistinct), 23–28 mm long, narrow proximal portion 18–20 mm long, 3–3.2 mm in diameter near midpoint, throat 4–10 mm long, upper lip 15–21 mm long, 2-fid at apex, lower lip 16–21 mm long, lobes 6–8 mm long, 3.5–4 mm wide. Stamens 17–18 mm long, filaments glabrous distally, thecae parallel, subequally inserted, 3.5–4 mm long, subequal in length, glabrous, with a rounded basal appendage 0.1–0.2 mm long (lower theca with a larger appendage than distal theca); pollen subprolate to euprolate, 4-aperturate (see discussion), polar diameter 52–55 μm, equatorial diameter 38–43 μm, insulae densely spaced but mostly discrete (rarely 2 sharing a common wall). Style 33–42 mm long, stigma 0.2 mm long, lobes not evident. Capsule and seed not seen.

PHENOLOGY.— Flowering: July; fruiting: July.

DISTRIBUTION AND HABITAT.— Southern Mexico (central Oaxaca; Fig. 1); plants occur in tropical deciduous forest at an elevation of 1673 m.

CONSERVATION.— The sole known collection of *Poikilacanthus foliosepalus* was made in the eastern portion of the Valley of Oaxaca. This species remains known only from the type locality, where an unknown number of individuals occurs, and from which it was collected in 2009. No information is known as to the current status of this species or any possible threats. Therefore, according to IUCN (2017) guidelines, the species has to be assessed as Data Deficient (DD).

ILLUSTRATION.— Figure 9.

DISCUSSION.— *Poikilacanthus foliosepalus* has one of the two pollen types characteristic of Mexican and Central American species treated in *Poikilacanthus* Lindau (Daniel 1991, 1998), that is, with four or more apertures and the entire surface covered with discrete “insulae” consisting of gemmate regions enclosed by thick, smooth marginal walls (Fig. 4D, E). Pollen of *Hernández O. 326*, examined with both scanning and light microscopy, appears to have four apertures, but it is possible that some of the grains might have five.

Pollen appears to offer the only distinction between *Poikilacanthus* and *Justicia* (e.g., Daniel 1991, 1998). Recent molecular phylogenetic studies of Justiciaeae reveal that *Poikilacanthus* is polyphyletic, with species placed in several lineages among the large, diverse, and monophyletic clade of New World justicioids (Kiel et al. 2017). Until such time as a comprehensive revision of all justicioids based on both molecular and morphological data has been completed, it seems reasonable to postpone generic/nomenclatural realignments and to maintain *Poikilacanthus*.

This species is distinctive among Mexican and Central American *Poikilacanthus* (Daniel 1991, 2010) by its wide and somewhat leafy calyx lobes (vs. up to 1.5 mm wide in the other species). A species of *Ruellia* (Ruellieae) with similar subfoliose calyx lobes was recently described by Daniel (2008) from Guerrero. *Poikilacanthus foliosepalus* also appears to be unique among its Mexican and Central American congeners by the four-aperturate (vs. five- or more-aperturate) pollen (Daniel 1998, 2010).

***Poikilacanthus pochutlensis* T.F. Daniel, sp. nov.**

Poikilacanthus pochutlensis differs from congeners by its dense and terminal dichasiate spikes with opposite dichasia, linear calyx lobes 4.5 mm long and 1.1 mm wide, red to orange-red corollas 45–60 mm long that are externally pubescent with glandular and eglandular trichomes, and five-aperturate pollen with linked insulae forming loops around rows of insulae.

TYPE.— MEXICO. **Oaxaca:** Distr. Pochutla, Cerro Espino, Finca Montecristo, [ca. 15°52'11.39"N, 096°24'50.89"W], 1150 m, selva mediana perennifolia, 5-IV-1984 (fl), *R. Torres & C. Martínez 4907* (holotype: FCME!).

Perennial herbs or shrubs to 1 m tall. Young stems densely and ± evenly pubescent with retrorse eglandular trichomes to 0.4 mm long. Leaves petiolate, petioles to 25 mm long, blades ovate to elliptic, 42–100 mm long, 20–50 mm wide, length:width = 1.6–2.5, acute to acuminate at apex, (rounded to) cuneate to attenuate at base. Inflorescence of dense, often very short, terminal spikes to 16 mm long (excluding corollas), rachis densely and evenly pubescent with flexuose to retrorse to retrorsely appressed eglandular trichomes to 0.4 mm long (appearing ± floccose), dichasia opposite, 1 per axil, 1-flowered, sessile. Proximal bracts subfoliose, ovate, 11–28 mm long, 5.5–8 mm wide, distal bracts oblong to broadly elliptic to obovate-elliptic, 7–11 mm long, 2.5–4 mm wide, all bracts abaxially and marginally pubescent with antrorse to antrorsely-appressed eglandular trichomes 0.05–0.6 mm long. Bracteoles lance-ovate, 5.5–6 mm long, 0.9–1.5 mm wide, abaxial surface pubescent like bracts (or with trichomes becoming flexuose to retrorse).

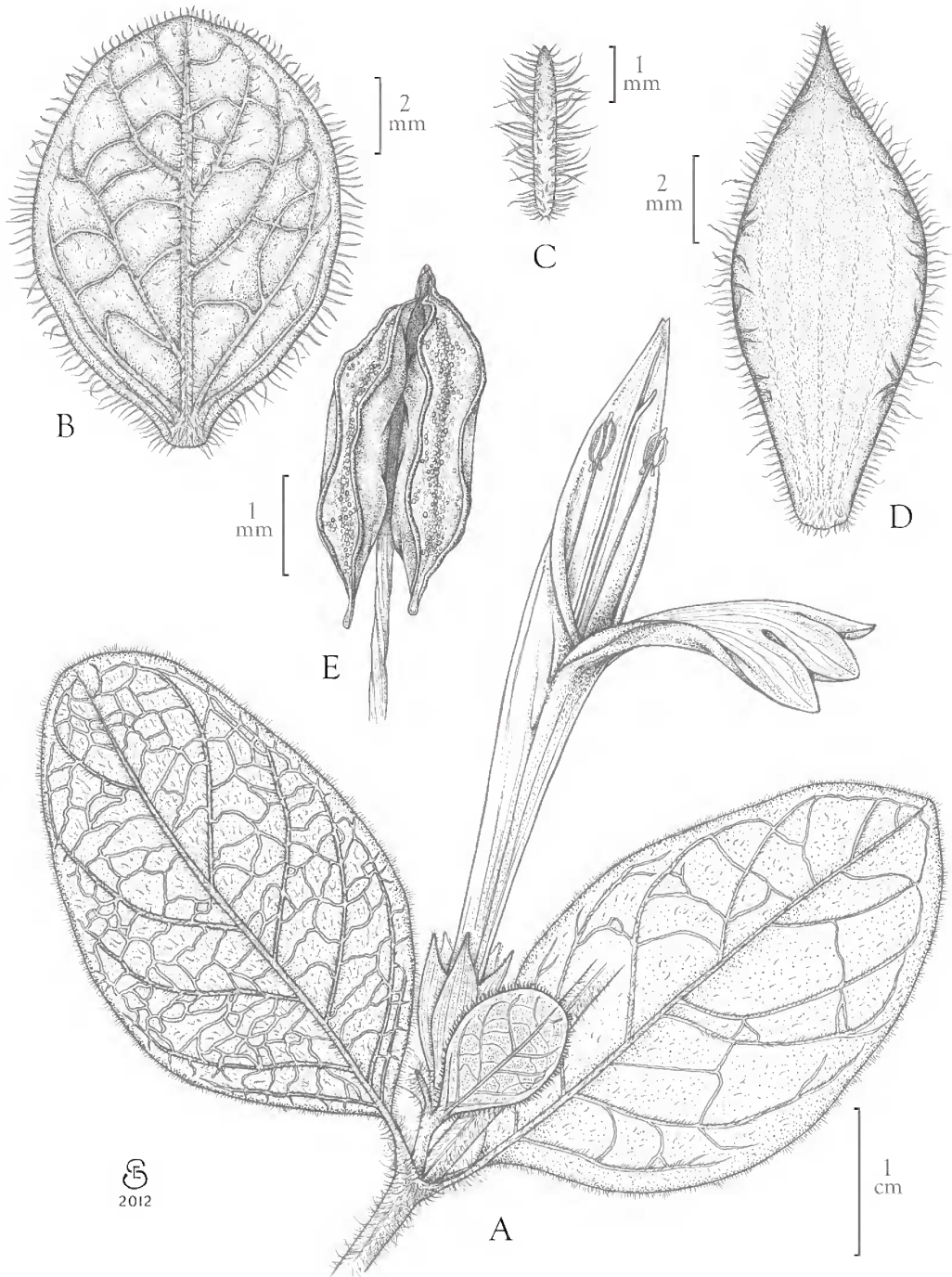


FIGURE 9. *Poikilacanthus foliosepalus* (from Hernández O. 326). A. Node with leaves, inflorescence, and flower. B. Bract. C. Bracteole. D. Calyx lobe. E. Distal portion of stamen with bithecos anther. Drawn by Sean Edgerton.

Calyx 5-lobed, 5 mm long, lobes linear, 4.5 mm long, 1.1 mm wide, similar in size, abaxially pubescent like bracteoles. Corolla bright and shiny red to orange-red, 45–60 mm long, externally pubescent with erect to flexuose eglandular and glandular trichomes 0.1–0.8 mm long, tube 22–35 mm long, 3.5–3.8 mm in diameter near midpoint, gradually expanded from base with no clear distinction between a narrow proximal portion and a throat, upper lip 22–25 mm long, emarginate at apex with lobes to 0.2 mm long, lower lip recoiled, up to 25 mm long. Stamens 22–24 mm long, filaments red, glabrous distally, thecae parallel, unequally inserted (overlapping by 1.6–1.8 mm), 2.5–2.7 mm long, \pm equal in size, dorsally glabrous, lacking basal appendages; pollen oblate-spheroidal, 5-aperturate, polar diameter 57 μ m, equatorial diameter 58–63 μ m insulae linked into 5 loops, each of which surrounds a linear row or an elliptic band of insulae. Style 45–53 mm long, stigma equally 2-lobed, lobes 0.1 mm long. Capsule and seeds not seen.

PHENOLOGY.— Flowering: April–May; fruiting: unknown.

DISTRIBUTION AND HABITAT.— Southern Mexico (central southern Oaxaca; Fig. 1); plants occur very sporadically in evergreen seasonal forest (*selva mediana perennifolia*), and cafetales therein, at elevations from 950 to 1150 m.

CONSERVATION.— This species is known from two collections, both from Cerro Espino (Fig. 3) some 200 meters apart in elevation, from which an EOO cannot be calculated. *Daniel & de Avila 12204* was collected along a trail in an overgrown and presumably abandoned (at least not maintained) coffee plantation where fewer than 10 plants were seen. The precise location of the type collection from Cerro Espino is not known; an approximation of coordinates for it is indicated above. Although the species would appear to be both local and rare, there is insufficient data to make a preliminary assessment for it other than Data Deficient (DD).

ILLUSTRATIONS.— Figures 3, 10.

PARATYPE.— MEXICO. **Oaxaca:** western slope of Cerro Espino, 0.5–1.5 km E of Finca Monte Cristo (abandoned), which is 10 km (by road) E of Mex. Hwy. 175 at jct. of turn to Toltepec, 15°52.282'N, 096°25.042'W, *T. Daniel & A. de Avila 12204* (CAS).

DISCUSSION.— Like that of *Poikilacanthus foliosepalus*, pollen reveals this species to be among those that pertain to *Poikilacanthus* as traditionally recognized (see discussion above under *P. foliosepalus*). Unlike *P. foliosepalus*, pollen of *J. pochutlensis* shows the second type described for the genus (Daniel 1991, 1998), that is, with the insulae sharing common endwalls and arranged in loops that enclose a row or band of insulae (Fig. 4G, H).

The paratype was only in bud when collected (Fig. 3), but has an unopened corolla 60 mm long (vs. to 49 mm long on the holotype).

NEW COMBINATIONS

Justicia chrysostephana (Hook.f.) T.F. Daniel, comb. nov.

Cyrtanthera chrysostephana Hook.f., Bot. Mag. 97: t. 5887. 1871. *Jacobinia chrysostephana* (Hook.f.) Benth. & Hook.f. ex Hemsl., Biol. Centr.-Amer. 2(12): 520. 1882. **TYPE.**—MEXICO. The description and illustration in the protologue are based on plants cultivated in England from materials imported from Mexico by Mr. Bull of Chelsea. A specimen at K (Fig. 11) that appears to represent original material bears Hooker's name, an indication that it was cultivated from plants of Mexican origin by Bull in December 1870, and reference to the illustration (5887) in the *Botanical Magazine* — all of which appear to be in Hooker's handwriting and conform to information in the protologue. This specimen is here treated as the holotype of this name. If it can be demonstrated that it is not original material (i.e., if all of this information on the specimen at K was added to a specimen cultivated after publication of the name), then another possibility for a type would be to choose the color illustration (Fig. 11) with details from the protologue (t. 5887) as lectotype.

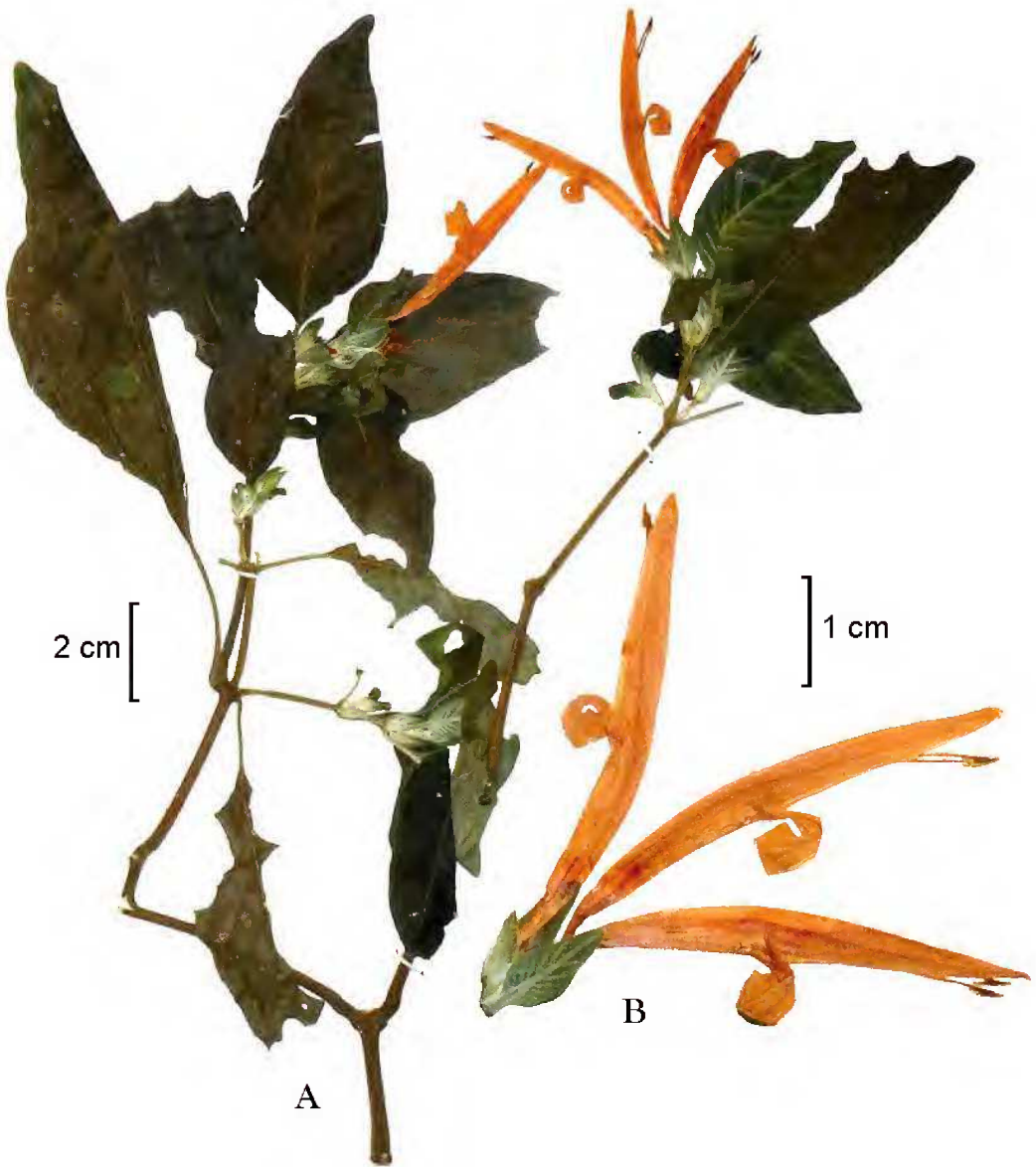


FIGURE 10. *Poikilacanthus pochutlensis*. A. Photograph of holotype specimen (Torres C. & C. Martínez 4907 at FCME). B. Enlargement of inflorescence with flowers.



FIGURE 11. *Justicia chrysocephala*. Photograph of holotype at K (top); illustration of *Justicia Lindenii* Houlet from protologue in *Revue Horticole* 42–43: 250. 1870–71 (bottom left); illustration of *Cyrtanthera chrysocephala* from protologue in *Botanical Magazine* 97: t. 5887. 1871 (bottom right).

Justicia lindenii Houliet, Rev. Hortic. 42–43: 250. 1870–71, as “*lindenii*,” non *J. lindenii* T. Anderson (1868), nom. illegit. & syn. nov. **TYPE**.— MEXICO. The description and illustration are based on plants cultivated in Paris from material procured in Mexico by “Hahne” (presumably L. Hahn who collected in Mexico in 1865–66); original specimens, if any exist, are unknown. The colored illustration accompanying the protologue (Fig. 11) would be a logical choice as lectotype, if this illegitimate name were to become legitimate and typification was needed. One might argue that the epithet should be retained as originally spelled (i.e., “*lindenii*”). Although the derivation of the epithet is neither stated nor alluded to in the protologue, presumably it is derived from J. Linden, another nineteenth century Mexican collector.

Justicia ardens T.F. Daniel, Proc. Calif. Acad. Sci. 53: 41. 2002, syn. nov. **TYPE**.— MEXICO. **Veracruz**: Mpio. Minatitlán, Cerro Blanco, ca. 7 km NE de Uxpanapa (Pob. 12) en camino a Pob. 15, ca. 17°14'N, 094°09'W, 200 m, 19-X-1983, T. Wendt et al. 4227 (holotype: CAS!; isotype: CHAPA).

DISCUSSION.— Both *Justicia lindenii* and *J. ardens* are here treated as conspecific with *Cyrtanthera chrysostephana*, necessitating the new combination proposed above. The nineteenth century descriptions and illustrations of *J. lindenii* and *C. chrysostephana* are very similar and generally conform to those of *J. ardens*. Indeed, the unusual inflorescence (e.g., Daniel 2002) was noted in the protologues of all three species. Minor discrepancies in the descriptions consist of: the red coloration of veins noted and illustrated (see Fig. 11) for living plants in the protologues of *C. chrysostephana* and *J. lindenii* (neither noted by collectors on labels nor observed in dried specimens of *J. ardens*) and the glabrous corollas noted by Hooker for *C. chrysostephana* (vs. glandular pubescent for *J. ardens*). Corollas on the holotype and other cultivated specimens of *C. chrysostephana* at K, and on collections of *J. ardens* are glandular pubescent (at least distally).

The species is known from wet forests of Oaxaca and Veracruz in southern Mexico, and its characteristics and a key to morphologically similar species were provided by Daniel (2002, as *J. ardens*). Based on collections of *J. chrysostephana* at K, plants were cultivated in English gardens (including RBG Kew) throughout much of the twentieth century, and as recently as 1978.

***Justicia durangensis* (Henr. & Hilsenb.) T.F. Daniel, comb. nov.**

Siphonoglossa durangensis Henr. & Hilsenb., *Brittonia* 31: 375. 1979. **TYPE**.— MEXICO. **Durango**: ca. 24 mi SW of Torreón, 7.1 mi W of Hwy. 40 on road to Presa Francisco Zarco along Río Nazas, ca. 25°16'N, 103°45'W, 1200 m, 15-VIII-1973, J. Henrickson 12422B (holotype: TEX).

DISCUSSION.— American species of *Siphonoglossa* Oerst. are now usually treated in *Justicia* L. (e.g., Graham 1988; Daniel 1995; Kiel et al. 2017). *Justicia durangensis* appears to be a distinct species as described and discussed by Henrickson and Hilsenbeck (1979) and Hilsenbeck (1983). Corollas 13.5 to 16.5 mm long were noted for the species by Henrickson and Hilsenbeck (1979). Smaller flowers (e.g., open corollas 5–9 mm long) on specimens collected in late September and October (e.g., Henrickson 22729 at CAS and TEX, and González et al. 7012 at CAS) likely represent reduced flowers (possibly transitioning to cleistogamous flowers) occurring late in the season. If true, a similar seasonal dimorphism has been observed in corollas of *J. longii* Hilsenb. (Daniel 2016), another species formerly treated as pertaining to *Siphonoglossa*.

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